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# Birch Leaf Roller



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Birch leaf rollers are a recurrent problem throughout south-central and interior Alaska. Although generally found every year in modest numbers, every few years populations dramatically increase as insect growth and development are enhanced by favorable climatic conditions. Populations remain high for a few years until drastically reduced by natural controls such as weather, predators, and pathogens.

Rural and urban residents of the Anchorage and Mat-Su Valley have recently witnessed a dramatic increase in leaf roller populations. Previous outbreaks in the late 1970s covered 49,525 acres with populations decreasing thereafter. An increase in leaf roller activity was detected in 2002, and by 2003 defoliation was estimated at 185,020 acres, more than triple the number of acres recorded in 2002. Much of this recent increase was found in the Susitna and Yentna River valleys.

Healthy, vigorous birch trees can usually sustain two to three years of light to heavy leaf rolling and insect feeding with only minor effects. The most common effects of heavy leaf rolling are temporary growth reduction, occasional branch dieback, and, rarely, tree death. If a birch tree is not vigorous, its probability of death increases with two or more years of heavy infestation.

## **Description and Life History**

Leaf rollers are members of a complex of leaf rolling larvae. While many different species of moth larvae are responsible for leaf rolling activity, in south-central Alaska, 90 percent of the leaf rolling on birch is caused by a single species, *Epinotia solandriana* L. This leaf roller is thought to have a one-year life cycle in south-central and interior Alaska.



**Figure 1.** *Birch leaf roller larvae.*

This leaf roller overwinters as an egg on roughened bud stalks of birch tree twigs. The eggs are laid singly and look like tiny, reddish-brown, scale-like protuberances. Eggs hatch in mid-May and the young, whitish-yellow larvae, begin to feed on new developing birch leaves. Older larvae are bluish-gray caterpillars (Figure 1), which begin to roll individual birch leaves in early June.

Birch leaf roller larvae spin silk webs around young leaves rolling them together to form feeding shelters. Single leaves may also be rolled into tight cylinders. Inside these shelters, the larvae skeletonized the leaves, (only the veins remain intact) and may at times consume them whole. Damage results from the larvae feeding within the folded, rolled or webbed leaves, causing them to turn brown and die. When disturbed, the larvae become extremely agitated and wiggle vigorously, often falling to the ground or dangling on silk strands.

By late June, the mature larvae leave their leaf rolls and drop to the ground to pupate. The pupal stage lasts three to four weeks in the soil. Small gray-brown mottled moths emerge in August and deposit eggs on birch twigs. Moths are commonly seen during the day on ground vegetation or on birch stems. Although variable in color and shade, they are characterized by a contrasting dorsal blotch (Figure 2). Larvae only carry out leaf rolling activity in the spring.

## **Guidelines for Reducing Damage**

For the most part, leaf roller suppression is not warranted on forested land. Leaf rollers are a natural occurrence in Alaska forests and cause very little permanent damage to the host tree. But, in urban areas, where trees are generally grown in more isolated, artificial conditions, leaf rollers can become much more damaging to a tree's health. The following control alternatives apply to urban and suburban settings only.

Monitoring should begin in the spring. Landowners should look for folded or rolled leaves among birch plantings. The leaves may be discolored or show some feeding damage (i.e., small, round holes in the leaves). Rolled leaves should be carefully picked, unrolled, and examined for the small green leaf roller larvae. If the rolled leaves do not have any larvae present, it is too late to control the larvae. Spraying would be ineffective and costly at this time.

If the trees are healthy and showing good growth, a few years of leaf rolling will not severely affect their diameter and height



**Figure 2.** *Birch leaf roller adult.*

growth, although temporary growth reduction may occur. Tree death is generally rare. Physical removal of the caterpillars is simple and effective on small trees or when leaf roller numbers are low.

Chemical insecticides are often ineffective because the larvae are protected within the rolled leaves inhibiting direct contact. A registered spray (such as carbaryl) may be applied in late May or early June when the larvae are still exposed. Systemic insecticides can be used on selected plants as per manufacturer instructions. Biological insecticides, such as BTK, are also effective when the larvae are exposed. A dormant oil application before bud break can effectively destroy overwintering egg masses.

BTK (*Bacillus thuringiensis*, kurstaki strain) is a naturally occurring bacterium that will attack only caterpillars. The BTK bacteria will not affect humans, pets, or other organisms in the environment. Therefore, it is very important to make sure that the problem is actually caterpillars, since BTK will not control other types of 'worms' such as sawfly larvae or leaf beetle larvae.

The caterpillars must actually consume the BT as they are feeding on foliage in order for it to be effective. Check with your local Cooperative Extension Service office for insecticides that are currently registered for leaf roller control.

Proper tree care techniques are useful in reducing the damage caused by leaf rollers and other insect pests. Roots of birch trees need a cool, moist, shady location. Proper site selection is crucial for a long, healthy existence. During the growing season, provide water, especially during the dry summer months, by thoroughly soaking the area under and around the tree at least once a week. Tree fertilization is best done in early spring at the onset of the growing season. Lawn fertilizer applications around the tree may be sufficient. Additional applications of a high phosphorous fertilizer such as 8-32-16 or super phosphate 0-50-0 in the fall, however, will aid in root development.

Prune any dead wood and remove the smaller of any branches that rub one another. Birch tree pruning is best done after the leaves are fully developed (Late June to Mid July). To reduce the risk of mechanical damage from lawn mowers, weed eaters etc.; remove any sod from an area immediately surrounding the tree trunk. In this area it's best to use a weed barrier or mat under an organic mulch to control weed development. Care should be taken to avoid damaging the trunk, injuring the roots, altering drainage patterns, or severely compacting the soil.

## Photography Credits

**Cover photo:** E. Holsten, USDA Forest Service

**Figure 1:** E. Holsten, USDA Forest Service

**Figure 2:** E. Holsten, USDA Forest Service

**CAUTION:** Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife—if they are not handled or applied properly. Use all pesticides selectively and carefully. Since approved uses of a pesticide may change frequently, it is important to check the label for current approved and legal use.

Follow recommended practices for the disposal of surplus pesticides and pesticide containers. Mention of a pesticide in this publication does not constitute a recommendation for use by the USDA, nor does it imply registration of a product under Federal Insecticide, Fungicide, and Rodenticide Act, as amended. Mention of a proprietary product does not constitute an endorsement by the USDA.

# Birch Leaf Rollers

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Additional information on this insect can be obtained from your local USDA Alaska Cooperative Extension office, Alaska State Forestry office, or from:

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